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EXAMINER

TSAI, SHENG JEN

ART UNIT	PAPER NUMBER
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2186

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/779,542

Applicant(s)

SHACKELFORD, DAVID MICHAEL

Examiner

Sheng-Jen Tsai

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

1. This Office Action is taken in response to Applicants' Amendments and Remarks filed on November 29, 2006 regarding application 10,779,542 filed on February 13, 2004.

2. Claims 1, 10, 17-19 and 22-23 have been amended.

Claims 27-37 have been added.

Claims 1-37 are pending for consideration.

3. ***Response to Remarks and Amendments***

Applicants' amendments and remarks have been fully and carefully considered.

In response, a new ground of claim analysis based on a newly identified reference (Romine, US 6,442,604) has been made. Refer to the corresponding sections of the following claim analysis for details.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6-9, 11-14, 16-19, 22-26 and 35-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Romine (US 6,442,604).

As to claim 1, Romine discloses **a signal bearing medium tangibly embodying a program of machine-readable instructions** [program memory (figure 2, 262~284) and buffers (figure 2, 264, 268 and 274); figures 1 and 6] **executable by a digital**

processing apparatus [the CPU, figure 2, 242] **to perform operations for restoring data** [Incremental Archiving and Restoring of Data in a Multimedia Server (title); during restoring of the production, ... (abstract)], **the operations comprising:**

receiving a request for at least a portion of the data [in a restoring process, program module 280 controls the CPU and IOC 248 to request and receive blocks formatted for sequential access from one of the digital tape units 202-210, through IOC 248 and into buffer 268 for storage (column 10, lines 42-46)];

creating a directory entry for the data in a virtual file system [It is noted that directory and the file entries are inherent attributes of a file system; further, Romine teaches that typically, a single production (i.e., the corresponding directory entry) comprises a video file and up to four audio files. Furthermore, there may be several auxiliary files specifying additional information, including arrangement information and time code information describing how to arrange the information from the video and audio files to form a multimedia stream and when to broadcast portions of the information to play the stream (column 4, lines 66-67 and column 5, lines 1-7); In a RAID system, instead of being stored on a single hard disk, each data file is about evenly spread out across several data disks by a RAID controller card. In addition, parity information is written to a parity disk, so that if any single disk drive fails, there will be no loss of data or access to the data. Access to the disks is cycled across the data disks by the RAID disk controller and parts of each disk file is read or written in turn to each data drive. This allows a large number of smaller inexpensive disks to

operate as though they were one large disk drive (column 3, lines 2-11); thus RAID represents a virtual file system];

allocating storage space for the data [this is inherent for the data retrieve process as the retrieved data must be stored somewhere; further, Romine teaches that there must be sufficient hard disk storage space for restoring the required productions so that other productions may have to be archived (column 5, lines 17-20)];

initializing a block virtualization indicator to a value indicating that the data is not available [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)];

writing a subset of the data to the storage space [the corresponding storage space is the had disk storage devices (figure 1, 112~120); in a restoring process, program module 280 controls the CPU and IOC 248 to request and receive blocks formatted for sequential access from one of the digital tape units 202-210, through IOC 248 and into buffer 268 for storage (column 10, lines 42-46); Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)]; **and**

changing the block virtualization indicator to a value indicating that the data is available for access by an application [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is

complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)], **after the subset of the data has been written to the storage space and without waiting for the entire data to be written to the storage space** [During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract); the system allows the files for the multimedia production in hard disk storage to be accessed and played, for example, by another video-on-demand viewer, as soon as sufficient portions of all the files of the production are restored onto the hard drives (column 7, lines 5-9); column 6, lines 49-58; column 10, lines 63-67; column 11, lines 5-8; column 11, lines 17-19; column 11, lines 35-38; column 12, lines 27-31].

As to claim 2, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise writing an additional subset of the data to the storage space** [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 3, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise identifying portions of the data that have not been written to the storage space** [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which

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writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 4, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise:**

receiving a request for a part of the data that at least partially is not written to the storage space [In addition, the viewer terminals may provide for inputting access requests, inputting control commands, telephone connection, Internet connection, or even transmitting multimedia data back the video server. The terminal may include apparatus for requesting access to multimedia productions and controls for video-on-demand functions discussed above (column 9, lines 25-30); in a restoring process, program module 280 controls the CPU and IOC 248 to request and receive blocks formatted for sequential access from one of the digital tape units 202-210, through IOC 248 and into buffer 268 for storage (column 10, lines 42-46); Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)];

retrieving and writing to the storage space the requested part of the data that is not written to the storage space [in a restoring process, program module 280 controls the CPU and IOC 248 to request and receive blocks formatted for sequential access from one of the digital tape units 202-210, through IOC 248 and into buffer 268 for storage (column 10, lines 42-46)]; **and**

responding to the request for the part of the data [in a restoring process, program module 280 controls the CPU and IOC 248 to request and receive blocks formatted for sequential access from one of the digital tape units 202-210, through IOC 248 and into buffer 268 for storage (column 10, lines 42-53)].

As to claim 6, Romine teaches that **the signal bearing medium of claim 4, wherein the operations further comprise indicating a busy condition** [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 7, Romine teaches that **the signal bearing medium of claim 4, wherein the operations further comprise retrieving an additional subset of the data, starting at a location sequentially after the retrieved data** [Typically, a small group of productions are repeated sequentially on a channel so that viewers who wish, may view the production at different times (column 5, lines 28-30); during restoration, the system first reads the blocks of the interleaved files in sequential format from the tape storage into a buffer (column 6, lines 49-51)].

As to claim 8, Romine teaches that **the signal bearing medium of claim 4, wherein the operations further comprise retrieving an additional subset of the data, starting at a location wherein data is expected to be requested next** [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-

31); during restoration, the system first reads the blocks of the interleaved files in sequential format from the tape storage into a buffer (column 6, lines 49-51); since the data to be retrieved is sequential, and since the system keeps tracks on which parts have been written and which parts have not been written yet, the data to be requested next is known].

As to claim 9, Romine teaches that **the signal bearing medium of claim 4, wherein the operations further comprise retrieving an additional subset of the data, starting at a randomly selected location** [data can be retrieved randomly from the randomly access storage devices (figure 1, 112~120) to serve requests from users (column 2, lines 25-32; column 5, lines 55-59)].

As to claim 11, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise backing up the data** [For this reason, important data is often copied onto removable media which is removed from the system so that no failure of the system can directly damage the data. This process is referred to as backing-up the data. If there is a failure in the computer system, the data on the system storage device can then be restored by copying the backed-up data from the removable media (column 2, lines 58-65)].

As to claim 12, Romine teaches that **the signal bearing medium of claim 11, wherein the operation of backing up the data comprises storing information identifying the storage locations of each of a plurality of blocks of the data** [it is inherent that the storage locations of data being backed up be known, otherwise it would be very difficult, if not impossible to retrieve the data later on; For this reason,

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important data is often copied onto removable media which is removed from the system so that no failure of the system can directly damage the data. This process is referred to as backing-up the data. If there is a failure in the computer system, the data on the system storage device can then be restored by copying the backed-up data from the removable media (column 2, lines 58-65)].

As to claim 13, Romine teaches that **the signal bearing medium of claim 11, wherein the operation of backing up the data further comprises storing metadata including access characteristics of blocks of the data, with the data** [typically, a single production (i.e., the corresponding directory entry) comprises a video file and up to four audio files. Furthermore, there may be several auxiliary files specifying additional information, including arrangement information and time code information describing how to arrange the information from the video and audio files to form a multimedia stream and when to broadcast portions of the information to play the stream (column 4, lines 66-67 and column 5, lines 1-7); In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

As to claim 14, Romine teaches that **the signal bearing medium of claim 11, wherein the operations further comprise associating with the data, metadata indicating access characteristics of blocks of the data** [typically, a single production (i.e., the corresponding directory entry) comprises a video file and up to four audio files. Furthermore, there may be several auxiliary files specifying additional information, including arrangement information and time code information describing how to arrange the information from the video and audio files to form a multimedia stream and when to broadcast portions of the information to play the stream (column 4, lines 66-67 and column 5, lines 1-7); In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

As to claim 16, Romine teaches that **the signal bearing medium of claim 1, wherein the data is restored from tape** [Also, during restoration, the same input/output unit of the server that is copying the data from the tape file to the disk drive (abstract)].

As to claim 17, refer to "As to claim 1" presented earlier in this Office Action. Further, Romine teaches delaying completion of I/O requests for accesses to portions of

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the data that are identified as being unavailable in an unavailable mapping [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 18, refer to "As to claim 1" presented earlier in this Office Action. Further, Romine teaches delaying completion of I/O requests for accesses to portions of the data that are identified as being unavailable in an unavailable mapping [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 19, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 22, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 23, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 24, refer to "As to claim 3" presented earlier in this Office Action.

As to claim 25, refer to "As to claim 4" presented earlier in this Office Action.

As to claim 26, refer to "As to claim 14" presented earlier in this Office Action.

As to claim 27, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise:**

permitting the application to access requested blocks of the data, only if the application requests access to blocks of the data that have been written to the storage space [Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies

access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 28, Romine teaches that **the signal bearing medium of claim 1, wherein the operations further comprise:**
indicating a busy condition, and writing blocks of the data for which access is requested, to the storage space on a priority basis, if the application requests access to blocks of the data that have not been written to the storage space
[Portion 380 keeps track of which parts of the files for a production have been written, allows access to the parts for which writing is complete, and denies access to the parts for which writing is not complete, and reports status back to the IOU (column 12, lines 27-31)].

As to claim 29, Romine teaches that the signal bearing medium of claim 28, wherein writing blocks of the data for which access is requested to the storage space on a priority basis comprises indicating a priority for the blocks of the data for which access is requested, in a queue of data items to be restored.

As to claim 30, Romine teaches that **the signal bearing medium of claim 1, wherein the subset of the data is a designated quantity of blocks of the data** [In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be

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retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

As to claim 31, Romine teaches that **the signal bearing medium of claim 1, wherein the subset of the data has a size that is a function of the access pattern of the data and the data type** [In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

As to claim 35, Romine teaches that **the signal bearing medium of claim 1, wherein the data is a file, and wherein the portion of the data is a portion of the file** [In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

As to claim 36, Romine teaches that **the signal bearing medium of claim 1:**
wherein the data is restored from a first storage, and wherein the first storage is a sequential access storage [the sequential tape units (figure 1, 202 and 210); In a video server, multimedia data for a production is archived with data blocks for a video disk file and data blocks for audio disk files and data blocks for auxiliary disk files all intermixed together in a single tape file, in approximately the same order required for producing a multimedia data stream. During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)]; **and**
wherein the storage space is allocated in a second storage, and wherein the second storage is a direct access storage [the random access storage devices (figure 1, 112~120); During restoring of the production, as the disk files are being copied to disk storage systems from the tape file, the data may be retrieved from the same disk files and played as a multimedia data stream as soon as enough information is available in the files to form the stream (abstract)].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romine (US 6,442,604), and in view of Matsuda et al. (U.S. 7,020,668).

As to claims 5 and 29, Romine does not mention that **the signal bearing medium of claim 4, wherein the requested part of the data that is not written to the storage space is retrieved on a priority basis.**

However, Matsuda et al. teach in the invention "Device for Retaining Important Data on a Preferential Basis" a system where data files in a storage device are ranked in the ascending order of importance for storing purpose in a networked storage environment [abstract; figures 3-4, 6-7 and 10].

Retrieving data on a priority basis allows data of higher importance to be restored first in a timely manner, and also allows better management of the capacity of the storage system [Matsuda et al., column 1, lines 40-54].

Therefore it would have been obvious for persons of ordinary skills in the art at the time of the applicant's invention to recognize the benefits of retrieving the data on a priority basis, as demonstrated by Matsuda et al., and to incorporate it into the existing method disclosed by Romine to further improve the performance of the system.

8. Claims 32-34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romine (US 6,442,604).

As to claims 32-34, Romine teaches that the subset of data is in the unit of blocks [Program module 262 includes section 286 for requesting file blocks as soon as sufficient blocks have been stored into files (column 11, lines 3-6)], but does not

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explicitly mention whether it is 1 block (claim 32), 10,000 blocks (claim 33) or 10 percent of the data blocks (claim 34).

However, it is noted that when the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. See MPEP 2144.04 provided below.

MPEP 2144.04

A. Changes in Size/Proportion

In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955) (Claims directed to a lumber package "of appreciable size and weight requiring handling by a lift truck" where held unpatentable over prior art lumber packages which could be lifted by hand because limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) ("mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled." 531 F.2d at 1053, 189 USPQ at 148.). In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

As to claim 37, Romine does not mention that data is compressed when stored on the first storage and not compressed when stored on the second storage.

However, compressed data and uncompressed data operations are well known in the art and commonly applied to data storage. For example, see Microsoft Computer Dictionary, Microsoft Press, 5th edition, 2002 [page 142 – data compression and page 538 – uncompress].

It is well known that data compression reduces the memory space for storing files, and that compressed data needs to be uncompressed to restore the data back to the original format for usage.

Therefore it would have been obvious for persons of ordinary skills in the art at the time of the applicant's invention to recognize the benefits of compressing data and the necessity that data needs to be uncompressed to restore the data back to the original format for usage, as well known in the art, and to incorporate it into the existing method disclosed by Romine to take advantage of the benefit of data compression in reducing the memory space for storing files, and to uncompress data to restore the data back to the original format for usage.

9. Claims 20-21 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Romine (US 6,442,604), and in view of Idei et al. (US Patent Application Publication 2003/0177330).

As to claims 20-21, Romine does not teach a file virtualization meta data server coupled to the host and a storage virtualization engine SAN volume controller coupled to the host.

However, Romine does teach that the invention is related to storage devices connected to a computer network [figure 1; column 3, lines 43-59]. Romine further teaches that the storage device is a RAID network where files are striped across a number of disks but appears to users as a single logic volume [This allows a large number of smaller inexpensive disks to operate as though they were one large disk drive (column 3, lines 2-11)], hence representing a virtualized file system.

Further, Idei et al. disclose in their invention "Computer System" a storage system having a file virtualization meta data server coupled to the host [Moreover, the storage capacity of the storage device itself, and the number of storage devices, file servers, or the like which are to be connected to a SAN (Storage Area Network) (paragraph 0002)] and a storage virtualization engine SAN volume controller coupled to the host [the SAN (paragraph 0002; figure 1, 130 and 132)].

Idei et al. also teach that the motivation of using the SAN virtualization architecture to connect computers and storage devices is to manage the large amount of data effectively in order to support increased storage capacity [paragraph 0002].

Therefore it would have been obvious for persons of ordinary skills in the art at the time of the applicant's invention to recognize the benefits of SAN virtualization architecture, as demonstrated by Idei et al., and to incorporate it into the existing method disclosed by Romine to manage the large amount of data effectively in order to support increased storage capacity.

As to claim 15, Idei et al. teach that **the signal bearing medium of claim 1, wherein the operation of creating a directory entry** [figure 2 shows the directory entry of the data (virtual volume information for each of the virtual volume); figure 3 shows the read-out history information and access history information regarding each entry of the virtual volume] **further comprises creating a pointer for the data in the virtual file system** [the virtual volume information shown in figure 2 provides the virtual block address, storage device Ids, logical unit numbers and logical block address information that serve as pointers to related storage space; the read-out history

information and readhead history information provide head virtual block address and bottom virtual block address information, which also serve as pointers to related storage space].

Allowable Subject Matter

10. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. ***Related Prior Art of Record***

The following list of prior art is considered to be pertinent to applicant's invention, but not relied upon for claim analysis conducted above.

- Shaw et al., (US 5,870,553), "System and Method for On-Demand Video serving from Magnetic Tape Using Disk Leader Files."
- Ofec et al., (US 6,920,537), "Apparatus and Methods for Copying, Backing Up and Restoring Logical Objects in a Computer Storage System by Transferring Blocks out of Order or in Parallel."
- Takeda et al., (US Patent Application Publication 2004/0172509), "Data Processing System Including Storage Systems."
- Edsall et al., (US Patent Application Publication 2003/0172149), "Methods and Apparatus for Implementing Virtualization of Storage within a Storage Area Network."
- Mogi et al., (US Patent Application Publication 2003/0093439), "Methods and Apparatus for Relocating Data Related to Database Management System."

- Mogi et al., (US Patent Application Publication 2003/0229645), "Data Mapping Management Apparatus."

Conclusion

12. Claims 1-9 and 11-37 are rejected as explained above.

Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shew-Fen Lin whose telephone number is 571-272-2672. The examiner can normally be reached on 8:30 - 5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosian Alam can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shew-Fen Lin
Examiner
Art Unit 2166

March 28, 2007


PIERRE BATAILLE
PRIMARY EXAMINER
3/28/07